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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/813,692	03/21/2001	Yutaka Shimizu	2500.65339	3442

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EXAMINER

BERNATZ, KEVIN M

ART UNIT	PAPER NUMBER
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1773

DATE MAILED: 09/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/813,692

Applicant(s)

SHIMIZU ET AL.

Examiner

Kevin M. Bernatz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5,6,11,12,14 and 15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6,11,12,14 and 15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Response to Amendment

1. Amendments to claims filed on July 14, 2005, have been entered in the above-identified application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

3. Regarding the limitation(s) "regulated lattice structure" in claim 2, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that applicants' appear to be attempting to distinguish the antiferromagnetic layer from "disordered" antiferromagnetic (AFM) layers, such as IrMn. The Examiner notes that even "disordered" AFM layers possess a crystalline ordered phase that can be deemed "regulated". As such, the Examiner deems that both disordered AFM alloys, such as IrMn, and ordered AFM alloys, such as PtMn and FeMn, are deemed to read on the claimed limitation.

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4. Regarding the process limitation(s) "based on epitaxy" in claim 11, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that the broadest reasonable interpretation of "epitaxy" is simply a layer deposited after a previous layer, since every layer will have some impact on subsequently deposited layers, either in view of wetting angles, crystal growth, diffusion of elements, etc. As such, the limitation "based on epitaxy" is interpreted as simply requiring the layers to be disposed in a certain order in the final product.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 – 3, 5, 6, 11, 12, 14 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Kamiguchi et al. (U.S. Patent No. 6,495,275 B2).

Regarding claims 1, 3, 11 and 12, Kamiguchi et al. disclose a magnetoresistive (MR) film (*Title*) meeting applicants' claimed structural limitations (*col. 20, lines 24 – 40*) as shown in Table 1, below. Regarding the limitations in relative surface roughness values, Kamiguchi et al. disclose forming the roughness of the K-layer (i.e. applicants' "compound existing between the antiferromagnetic bonding layer and the second pinned ferromagnetic layer") to be less than the roughness of the layers deposited before it, since such a roughness will then propagate to the layers deposited on the K-layer (*col. 2, lines 46 – 65; col. 13, lines 8 – 24; and col. 13, line 50 bridging col. 14, line 29*).

Table 1: comparison of claimed and prior art structure

Claimed layer	Kamiguchi et al. (exp. 14)
AFM layer	IrMn (20 nm)
1 st Pinned FM layer	Co-Fe (2 nm)
AFM bonding layer	Ru (0.8 nm)
Compound	K-layer of Ru-oxide
Second pinned FM layer	Co-Fe (1.5 nm)
Non-magnetic spacer	Cu (3 nm)
Free FM layer	Co-Fe (1.5 nm)/NiFe (2 nm)

Regarding claim 2, Kamiguchi et al. disclose AFM layers meeting applicants' claimed limitations (*col. 20, line 24 bridging col. 21, line 19*).

Regarding claims 5, 14 and 15, Kamiguchi et al. disclose AFM bonding layers meeting applicants' claimed thickness and material limitations (*see table 1 above*)

Regarding claim 6, Kamiguchi et al. disclose non-magnetic spacer layers meeting applicants' claimed limitations (*col. 25, lines 17 – 28*).

Response to Arguments

7. The prior rejection of claims 1 – 3, 5, 6, 11, 12, 14 and 15 under 35 U.S.C § 112, 102 and/or 103

Applicants' amendments have resulted in the prior rejections being withdrawn. As such, applicant(s) arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kamiguchi et al. (U.S. Patent No. 6,303,218 B1), Mizuguchi (U.S. Patent App. No. 2001/0036046 A1) and Mizuguchi (U.S. Patent No. 6,765,769 B2) are deemed to be 102-type art, though the Mizuguchi references do not explicitly mention the surface roughness limitations. No rejection has been made using the above references since the rejection of record is deemed the closest prior art and any arguments or amendments to overcome the applied reference is reasonably expected to also overcome any rejection predicated on the above three cited prior art references.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

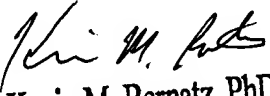
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
September 26, 2005


Kevin M. Bernatz, PhD
Primary Examiner